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(54) Abstract Title  
Seating assembly

(57) A storage structure for a collapsible seat is disclosed comprising a seat assembly, a floor 2 having a storage recess 4, and a linkage assembly between the seat assembly and the recess. The seat assembly has a seat 10 and a squab 12. The seat 10 is connected to the recess 4 by the linkage assembly. The seat assembly is moveable between a stored position in which a rear surface 20 of the squab 12 is substantially flush with the floor 2 surrounding the recess 4 and a deployed position in which the rear surface 20 of the squab is inclined at an angle to the floor surrounding the recess.

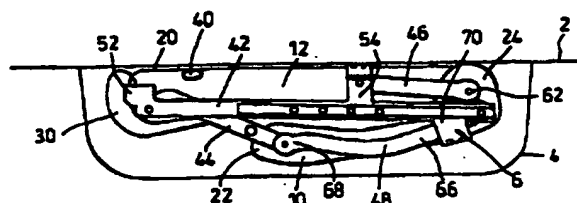


Fig. 1

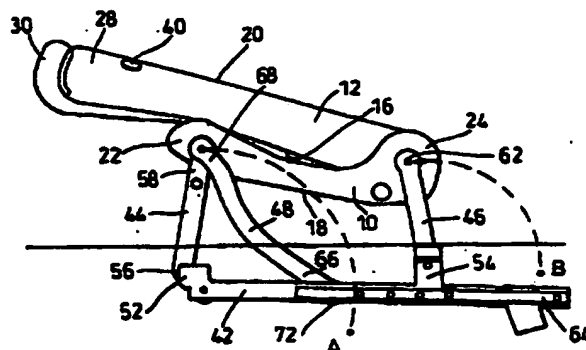
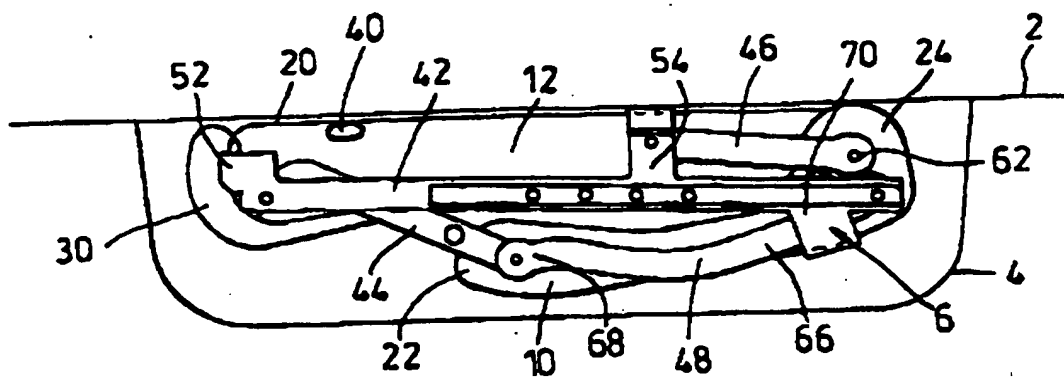
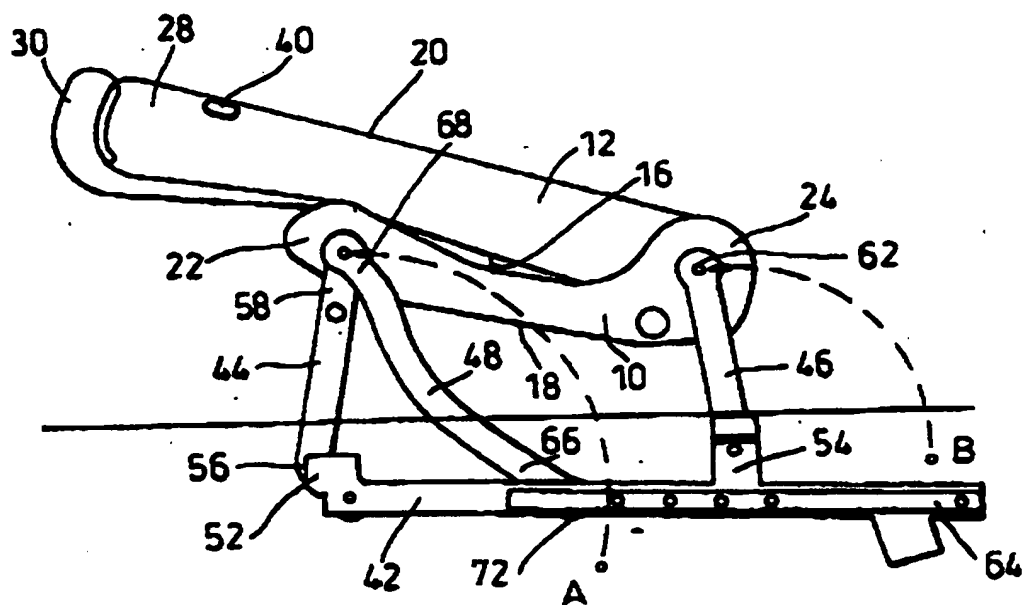


Fig. 2

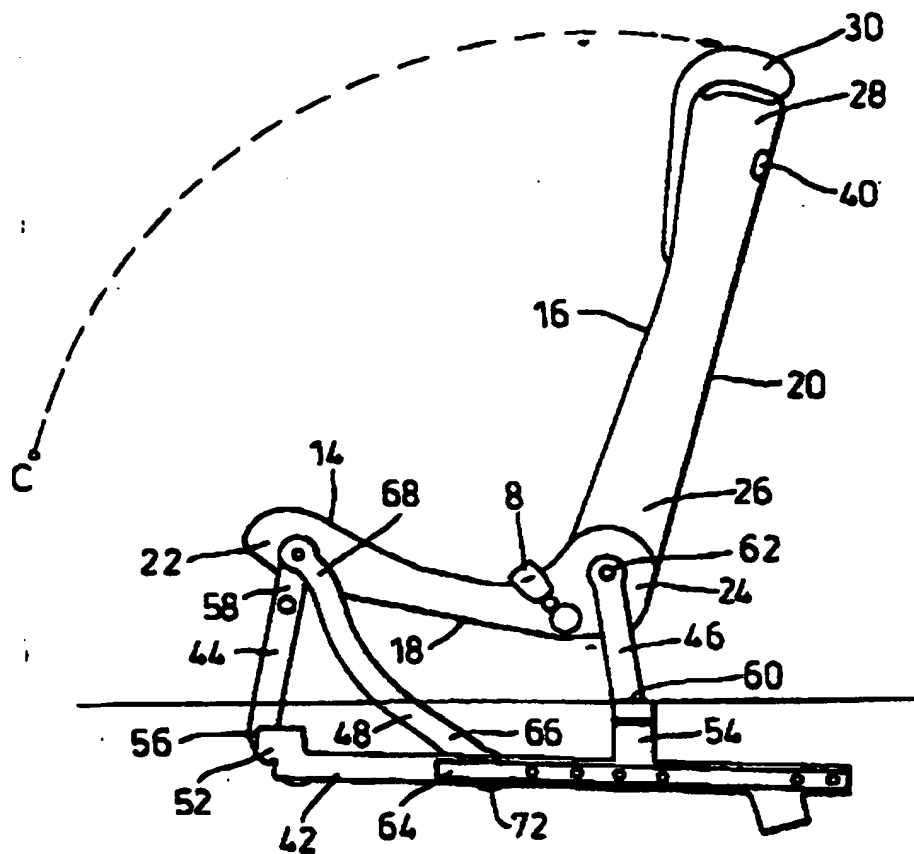
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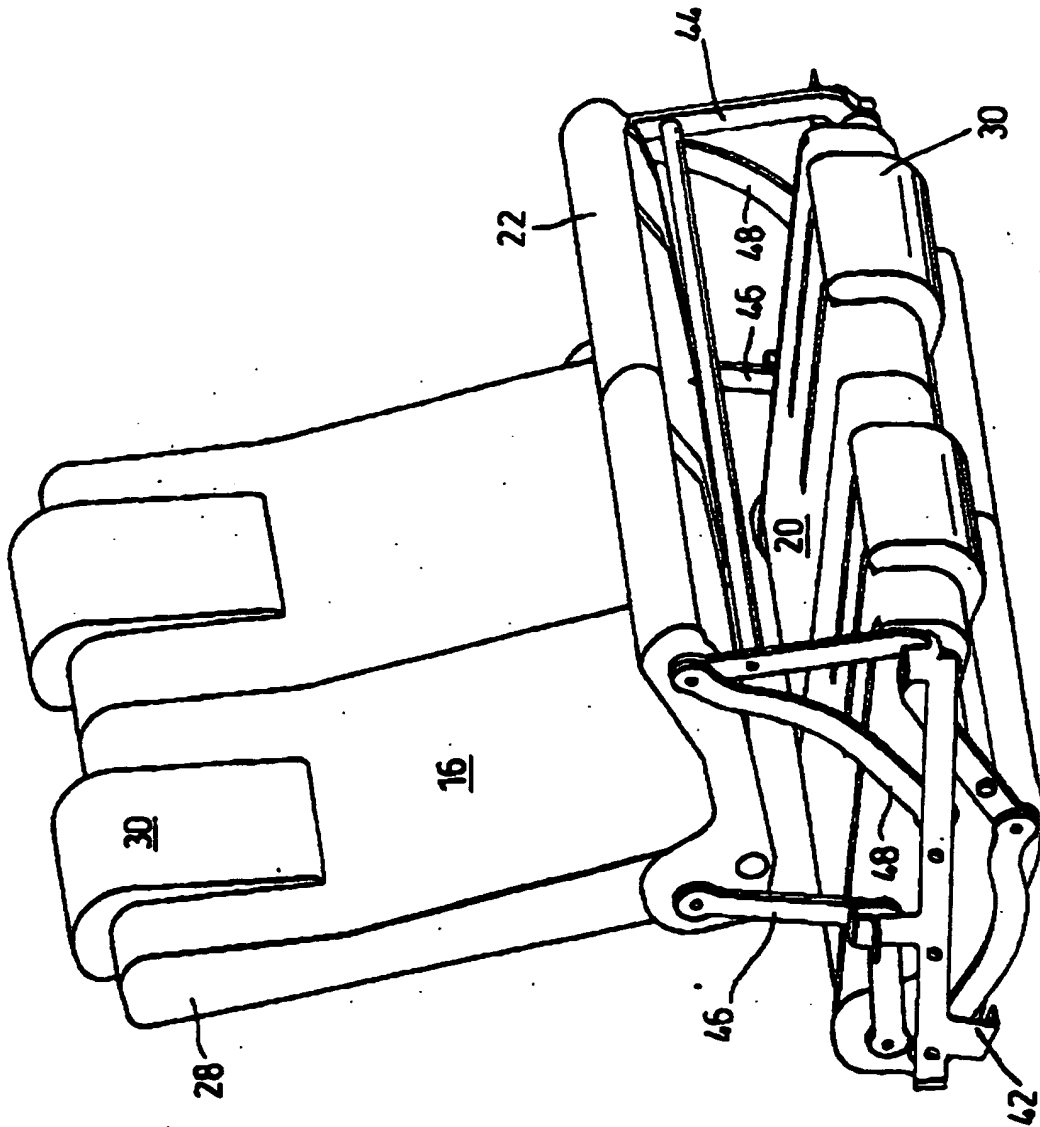
**Fig. 1**



**Fig. 2**



**Fig. 3**



**Fig. 4**

Seating Assembly

The present invention relates to a seating assembly, and in particular, but not exclusively to a motor vehicle seat assembly of the kind commonly referred to as third row seating.

It is known to provide additional seating in a motor vehicle to provide a third row of passenger seating. It will be understood that load space within a vehicle is highly desirable and with vehicle fitted with such third row seating load space is at a premium. In order that  
5 such third row seating does not occupy such valuable load space within the motor vehicle when not in use it is known to make such third row seating removable. However, removal, storage and subsequent reinstallation of such seating is at best inconvenient to a user of the motor vehicle.

10 It has also been proposed to make such third row seating collapsible such that while always present within a vehicle the available load space can be improved by manipulation of the seating. However, in some cases, it is known for the third row seating still to project from the load space of a vehicle reducing the load space available for use in comparison with a motor vehicle not fitted with such third row seating.

15 It is known to provide third row seating that can be stored within a recess such that when in a stored position, the third row seating does not extend into the load space of a motor vehicle. The seat assembly comprises a seat and a squab. The seat is hingedly connected at a rear top surface to a squab, and pivotally connected at a rear lower surface to an upper region of a recess provided in a floor of a load space of a motor vehicle. From a stored position, the  
20 seat is rotated about a pivot, and the squab hinged away from the seat to present a deployed seat assembly. The seat is stored by returning the squab adjacent the seat and rotating the seat back around the pivot.

This construction has a number of limitations. Since the recess is sized to store the squab beneath the seat, the seat and squab are of similar dimensions. This may result in a

squab of lower height than is comfortable for a passenger using such third row seating. If the squab and recess are enlarged, an undesirable channel is formed behind the seat in the load space when the seat is stored. In addition, it is desirable to provide some spacing between the front of the seat and the vehicle floor to accommodate a lower leg region of the passenger. In  
5 this construction while a support leg may be deployed from the front of the seat to raise the front of the seat from the floor of the load space, this also has the effect of tripping the seat assembly slightly backwards.

Other structures are known. It is a disadvantage of many third row seating arrangements that access to the seating is required to the seating from a rear of the load space  
10 in order to deploy and/or store the seating. This requires opening of a rear tailgate. This in turn requires sufficient clearance to the rear of the vehicle to allow the tailgate to be opened. This is not always possible.

According to a first aspect of the present invention, a storage structure for a collapsible seat comprises a seat assembly, a floor having a storage recess, and a linkage assembly  
15 between the seat assembly and the recess, the seat assembly having a seat and a squab, is characterised in that the seat is connected to the recess by the linkage assembly such that the seat assembly is moveable between a stored position in which the seat is retained in a plane within the recess and a deployed position in which the seat is vertically spaced from the recess in a plane substantially parallel thereto, and in that the squab is independently pivotable  
20 between a first position and a second position with respect to the seat.

Preferably, in the stored position a rear of the squab is substantially flush with the floor surrounding the recess and in the deployed position the rear of the squab is at an angle to the floor surrounding the recess.

This has as an advantage that when the seat assembly is in the stored position, it does not intrude into a load space of a motor vehicle incorporating the seat assembly and the associated storage structure.

Preferably, locking means are provided to retain the seat assembly in either the stored  
5 condition or the deployed condition. More preferably, release means are provided for in an upper region of the squab to release the locking means. Even more preferably, the release means comprises a handle located in a shoulder region of the squab.

The invention will now be described, by way of example only, with reference to the accompanying drawings, in which:

10 Figure 1 shows a schematic side view of a storage structure for a collapsible seat in accordance with the present invention in a stored position;

Figure 2 shows a schematic side view of the storage structure of Figure 1 in an intermediate position between the stored position and a deployed position;

Figure 3 shows a schematic side view of the storage structure of Figure 1 in the  
15 deployed position; and

Figure 4 shows an isometric view of a storage structure for a collapsible seat in accordance with the present invention in both a deployed position and a stored position.

Referring first to Figure 1, a collapsible seat is shown in a stored within a recess 4. The recess 4 is formed in a floor panel 2 of a load space of a motor vehicle. The recess 4 is  
20 conveniently formed in that part of the floor panel located between the longitudinally directed load bearing members of the motor vehicle body-in-white, often referred to as the vehicle longitudinals. In some vehicles it may be necessary also to take account of a tunnel formed with and extending beneath the floor panel accommodating a transmission mechanism.

The collapsible seat comprises a seat assembly and a linkage assembly. The linkage assembly is disposed between the seat assembly and the recess 4 to connect the seat assembly and the recess together.

5 The seat assembly comprises a seat 10 and a squab 12. The seat and the squab have substantially planar surfaces on which in use a user is designed to be seated. These are referred to herein as the seating surfaces 14,16 of the seat and the squab. The obverse sides of the seat and squab to the seating surfaces are referred to as the rear surfaces 18,20 of the seat and the squab.

The seat has a first end 22 and a second end 24. The squab has a first lower region 26  
10 and a second upper region 28. The first lower region of the squab 12 is pivotally connected to the first end 22 of the seat 10, to allow the squab to be independently pivotable between a first position and a second position with respect to the seat. Conveniently, the squab and the seat may be releasably latched relative to each other in either a stored position (Figure 1) and a deployed position (Figure 3). Adjustment means (not shown) may also be provided to  
15 adjust the relative position of the squab and the seat in the deployed position.

In the stored position, the seating surfaces 14,16 of the seat and the squab are disposed substantially opposite and adjacent to one another. In the deployed position, as would be expected, the seating surfaces are spaced from one another to allow a vehicle occupant to be seated. In other words, in the stored position the squab is located in a plane substantially  
20 parallel to that containing the seat and in the deployed position the squab is located in a plane inclined to that containing the seat.

The second upper region 28 of the squab 12 may comprise a headrest 30 or similar portion. The headrest 30 may conveniently be adapted to telescopically extend from the upper region 28 of the squab 12.

It can be seen in this stored position that the recess 4 is of a depth such that the rear surface 20 of the squab 12 is substantially flush with the floor panel 2 in which the recess 4 is formed. The rear surface 18 of the squab is conveniently made of steel or other similar material in order that loads stored in the load space while the seat assembly is in the stored position do not cause damage to the squab 12 or other parts of the seat assembly. The length and breadth of the recess 4 are so shaped and sized so as to fit the height and breadth of the squab 12.

Since the length and breadth of the recess 4 are sized to fit the squab, the size of the opening is limited only by the size of the floor of the load space available. A lower portion of the recess may be contoured to allow for any difference in size between the seat 10 and the squab 12. Alternatively, the recess 4 may be generally box shaped to create a covered storage space between the second end 24 of the seat 10, an upper region of the seating surface 16 of the squab 12 and the recess 4.

Conveniently, a seat belt retainer 8 may be provided on a side face of the seat 10 at the first end 22 of the seat. This has the advantage that when the seating assembly is in the stored position, the seat belt retainer 8 does not extend into the load space of the motor vehicle.

A seat belt deployment mechanism (not shown) may be provided on an opposite edge of the seating assembly to the seat belt retainer on the first end of the seat, the lower region of the squab or the upper region of the squab. Alternatively, the seat belt deployment mechanism may be provided at an associated portion of the load space of the vehicle.

The linkage assembly comprises at least two parallel linkages 6. In the case of a seat for a single person, two linkages may be used, one to each side of the seating assembly. In the case of a bench type seating assembly a further linkage or linkages may be provided between the side linkages. In the illustrated embodiments, only the side linkages are shown. Since

the linkages operate in tandem and are substantially identical, only one linkage 6 will be described. In describing operation of the structure, unless the context indicates otherwise, reference to more than one linkage will be implicit.

Each linkage 6 comprises a tie bar 42, a first tie member 44, a second tie member 46,  
5 and a sliding support member 48. The tie bar 42 is secured to the recess 4 in the floor panel of the motor vehicle load space. The tie bar may be secured by any suitable means such as welding or other fastening means securing flanges provided on the tie bar 42 to the floor panel 2 of which the recess 4 forms a part.

The first tie member 44 is pivotally connected at a first end 56 to a front end 52 of the  
10 tie bar 42. The first tie member 44 is pivotally connected at a second end 58 to one side of the second end 24 of the seat 10.

The second tie member 46 is pivotally connected at a first end 60 to a portion 54 of the tie bar which in the deployed position is substantially below the first end 22 of the seat 10. The second tie member 46 is pivotally connected at a second end 62 to the one side of the  
15 first end 22 of the seat 10.

The sliding support member 48 is releasably retained at a first end 66 for movement along a track 64 associated with the tie bar 42. In the stored position, the first end 66 of the sliding support member 48 is releasably retained at a first end 70 of the track 64. In the deployed position, the first end 66 of the sliding support member 48 is releasably retained at a  
20 second part 72 of the track 64 .

This may conveniently be achieved by providing a trigger latch (not shown) for the sliding support member 48. Actuation of the trigger latch is conveniently by way of a handle 40 provided at an upper region of the squab 12. By varying the location of the second part 72 of the track, the height of the seat 10 can be adjusted in a manner to be described.

The sliding support member 48 is pivotally connected at a second end 68 to the second end 58 of the first tie member 44 at the second end 22 of the seat. Preferably, the sliding support member 48, the first tie member and the seat are connected by way of a common pivot or spigot.

5        The deployment of the seating assembly from the stored position will now be described. The handle 40 on the side of the upper portion of the squab 12 is operated to actuate the trigger latch to release the first end 66 of the sliding support member from the first end 70 of the track. The first and second tie members 44,46 are then free to rotate about their respective first ends 56,60 in the directions indicated by arrows A and B (Figure 2). This  
10 raises the seat 10 in a substantially parallel manner from the stored position to a deployed position. Once the desired height has been obtained, the handle 40 is operated to actuate the trigger latch to retain the first end 66 of the sliding support member at the second part 72 of the track. For example, the handle 40 can be pulled to release the trigger latch and released to reset the trigger latch.

15        In this position, the seating surfaces 14,16 of the seat and the squab are still disposed substantially opposite and adjacent to one another since the squab is maintained in a plane substantially parallel to that containing the seat.

With the seat 10 in the deployed position, the latch between the seat and the squab is released by any suitable means and the squab 12 moved relatively backwards and upwards in  
20 the direction of arrow C to place the squab 12 in the deployed position (Figure 3), i.e. the squab moved to a plane inclined to that containing the seat.

The seat assembly may be returned to the stored position from the deployed position by reversing the operations described above.

In use deploying the seat assembly from the stored position to the deployed position requires relatively opposing movement of the two operations; raising the seat 10 and raising the squab 12. In the illustrated embodiment, the seat 10 is raised by an anti clockwise motion of the seat, and raising of the squab 12 requires a clockwise motion. Conversely, returning  
5 the seat assembly from the deployed position to the stored position requires anti clockwise motion of the squab 12 and anti clockwise motion of the seat 10.

Accordingly raising of the squab 12 will not lead inadvertently to further raising of the seat 10.

It will be appreciated that the seat assembly and linkage can be operated prior to  
10 installation in a motor vehicle, thereby eliminating any that operate incorrectly. Further in assembly of the motor vehicle, the only time involved to fit the seat and associated linkage is the time taken to fit the tie bar to the recess.

It will also be understood that with the second end of the seat 10 being directed to a front end of the motor vehicle, the seating assembly can be deployed and/or stored relatively  
15 easily from in front of the seating assembly by a user. The user pulls the seat 10 up into position using the handle 40, and raises the squab 12 by lifting up and then pushing the squab into position. Accordingly access from the rear portion of the motor vehicle is not required for a seat assembly as described fitted in this manner.

**CLAIMS**

1. A storage structure for a collapsible seat comprises a seat assembly, a floor having a storage recess, and a linkage assembly between the seat assembly and the recess, the seat assembly having a seat and a squab, is characterised in that the seat is connected to the recess by the linkage assembly such that the seat assembly is moveable between a stored position in which the seat is retained in a plane within the recess and a deployed position in which the seat is vertically spaced from the recess in a plane substantially parallel thereto, and in that the squab is independently pivotable between a first position and a second position with respect to the seat.
2. A storage structure according to claim 1, characterised in that in the first position the squab is located in a plane substantially parallel to that containing the seat and in the second position the squab is located in a plane inclined to that containing the seat.
3. A storage structure according to claim 1, characterised in that in the first position a seating portion of the squab is adjacent to a seating surface of the seat and in the second position the seating portion of the squab is spaced from the seating surface of the seat.
4. A storage structure according to any previous claim, characterised in that in the stored position a rear of the squab is substantially flush with the floor surrounding the recess and in the deployed position the rear of the squab is at an angle to the floor surrounding the recess.
5. A storage structure according to any previous claim, characterised in that locking means are provided to retain the seat assembly in either the stored condition or the deployed condition.
6. A storage structure according to claim 5, characterised in that release means are provided for in an upper region of the squab to release the locking means.

- 7       A storage structure according to claim 6, characterised in that the release means comprises a handle located in a shoulder region of the squab.
- 8       A storage structure according to any previous claim, characterised in that the linkage assembly comprises at least two linkages, at least one linkage of said at least two linkages comprising a tie bar, a first tie member, a second tie member and a sliding support member.
- 9       A storage structure according to claim 8, characterised in that the first tie member is pivotally connected at a first end to a front end of the tie bar, the first tie member is pivotally connected at a second end to one side of the second end of the seat, the second tie member is pivotally connected at a first end to a portion of the tie bar which in the deployed position is substantially below the first end of the seat and the second tie member is pivotally connected at a second end to the one side of the first end of the seat.
- 10       A storage structure for a collapsible seat substantially as described herein with reference to and as illustrated in the accompanying drawings.
- 11       A collapsible seat comprising a seat assembly and a linkage assembly substantially as described herein with reference to and as illustrated in the accompanying drawings.
- 12       A motor vehicle incorporating a storage structure according to any previous claim.



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Claims searched: All

Examiner: Richard Gregson  
Date of search: 25 January 2000

## Patents Act 1977 Search Report under Section 17

### Databases searched:

UK Patent Office collections, including GB, EP, WO & US patent specifications, in:

UK Cl (Ed.R): A4L LBPB, LBPC, LBPE, LBPG, LBPT; B7B BHD, BEA, BEC

Int Cl (Ed.7): B60N 2/00, 2/04, 2/30, 2/36.

Other: Online: EPODOC, WPI, JAPIO.

### Documents considered to be relevant:

Category	Identity of document and relevant passage	Relevant to claims
A	EP 0940288 A (MAZDA) - see whole document	1-4
A	US 5269581 A (HONDA) - see whole document	1-4
X	WPI Abstract. Acc. No.1998-266357 & JP10-086721 (SPRING) - see whole document	1-4
X	PAJ Abstract. JP 6-219198 (MAZDA) - see whole document	1-4
X	PAJ Abstract JP 3-200444 (SUZUKI) - see whole document	1-5

X	Document indicating lack of novelty or inventive step	A	Document indicating technological background and/or state of the art.
Y	Document indicating lack of inventive step if combined with one or more other documents of same category.	P	Document published on or after the declared priority date but before the filing date of this invention.
&	Member of the same patent family	E	Patent document published on or after, but with priority date earlier than, the filing date of this application.